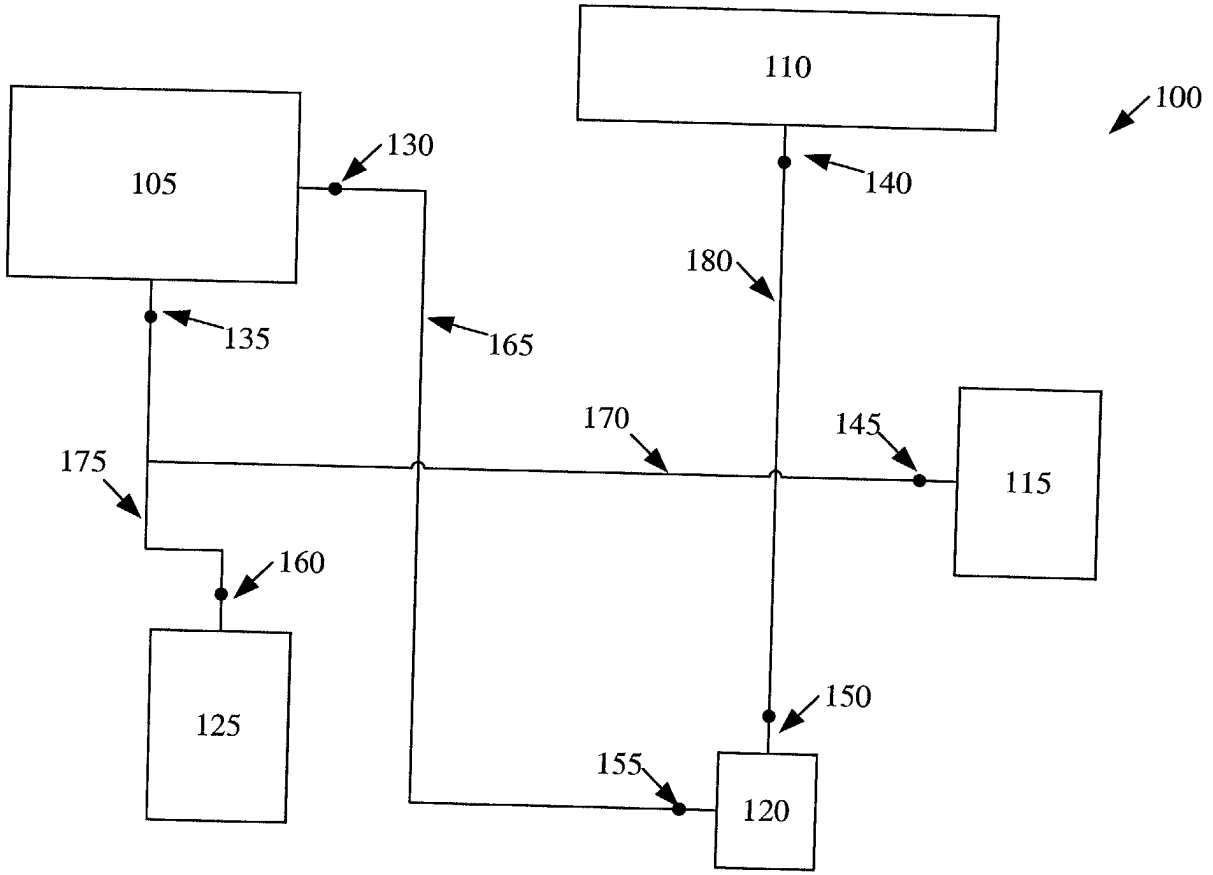
110
100
105
130
140
180
135
165
170
145
115
175
160
125
150
155
120

Figure 1

Patent Application

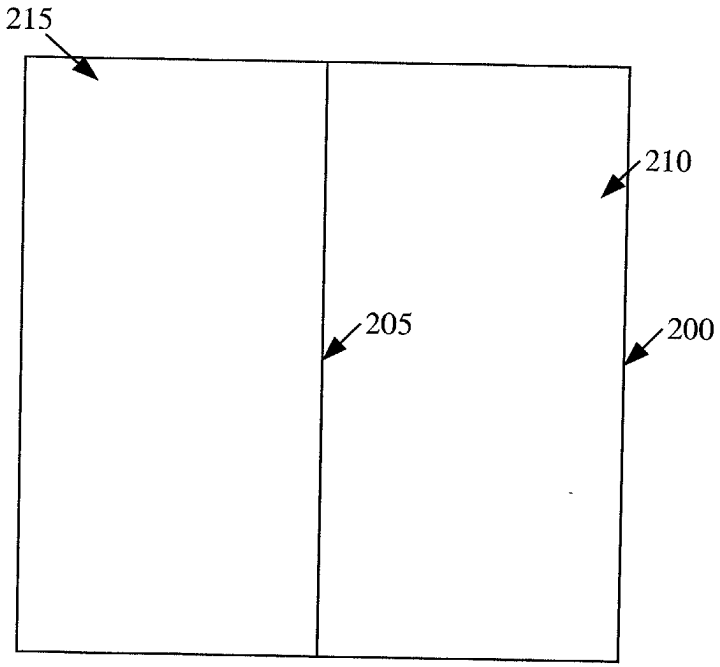

Figure 2

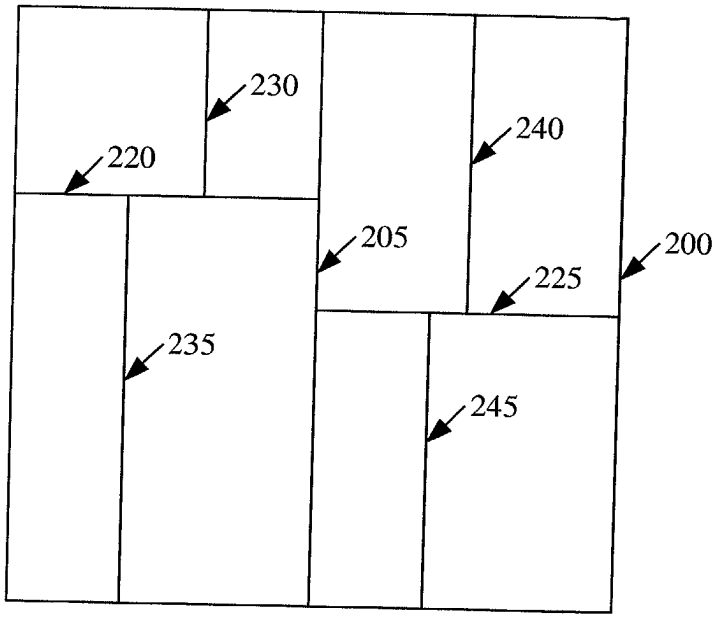

Figure 3

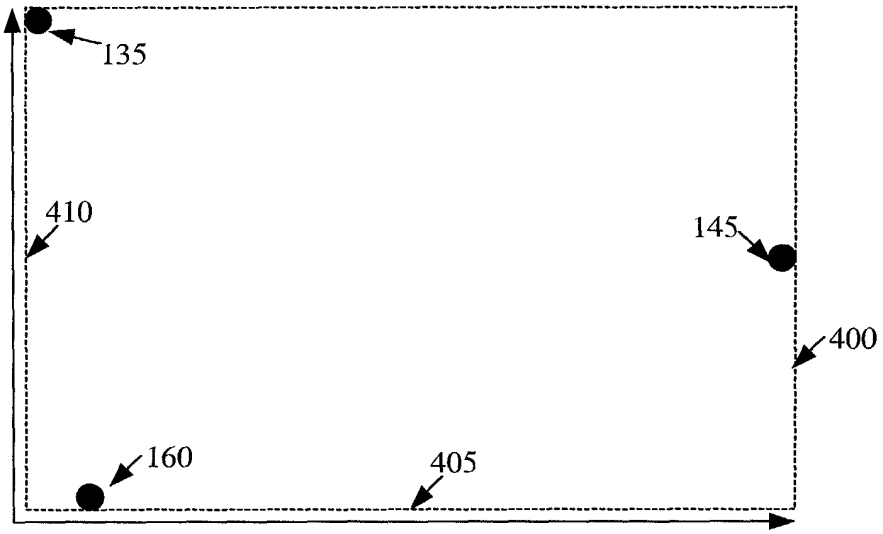

Figure 4

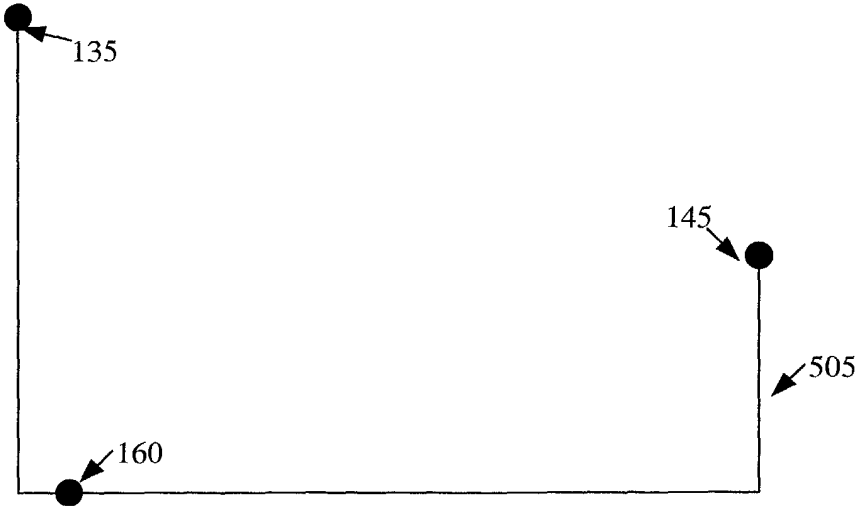

Figure 5

EP0950°5A2 I

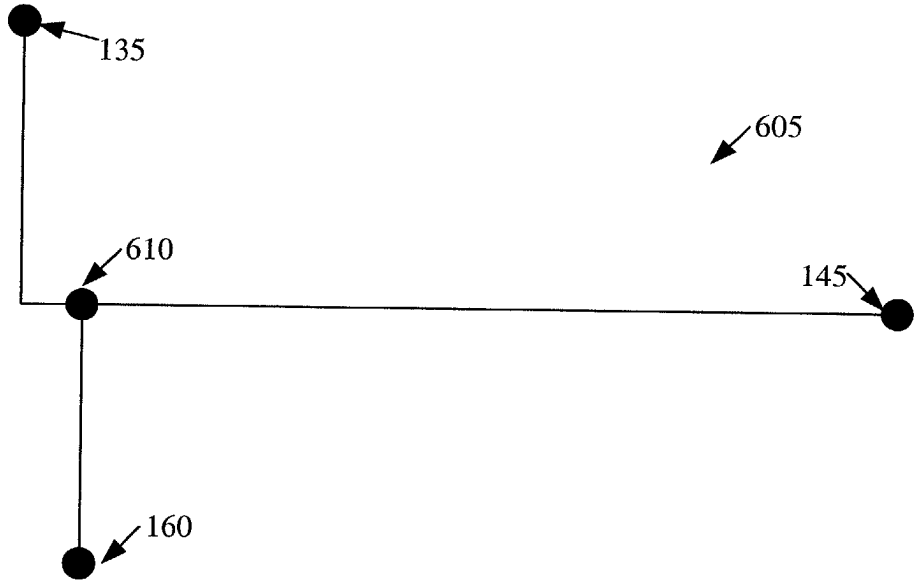

Figure 6

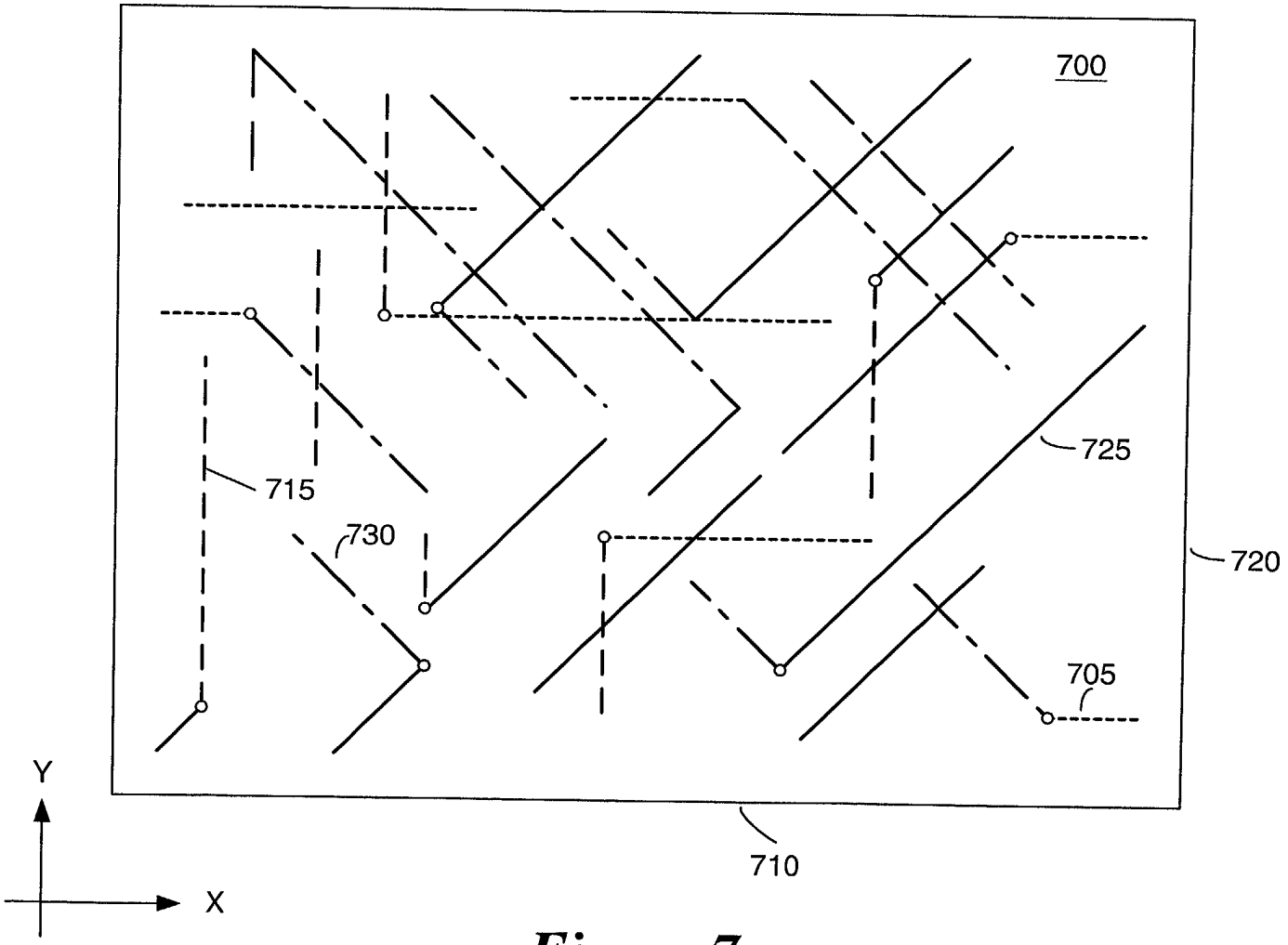

Figure 7

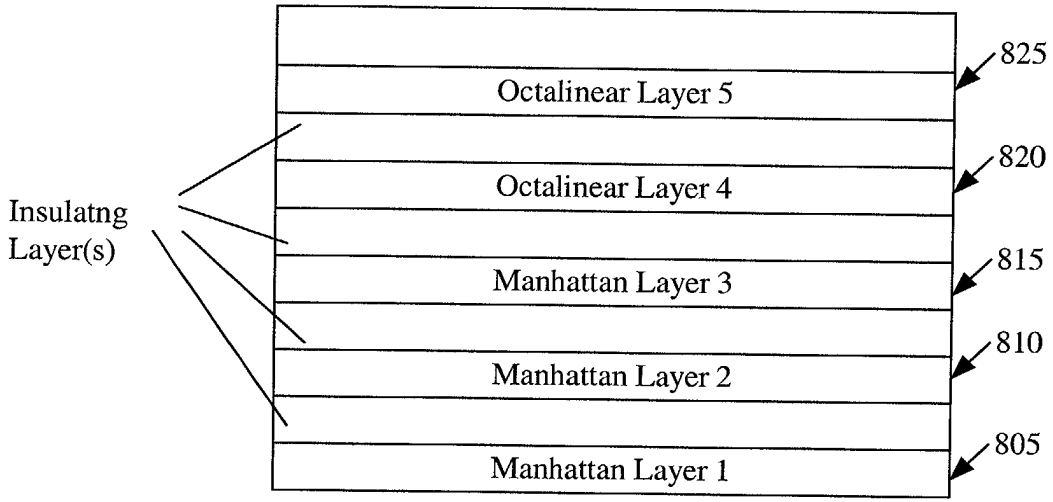
Insulatng
Layer(s)
Octalinear Layer 5
Octalinear Layer 4
Manhattan Layer 3
Manhattan Layer 2
Manhattan Layer 1
825
820
815
810
805

Figure 8

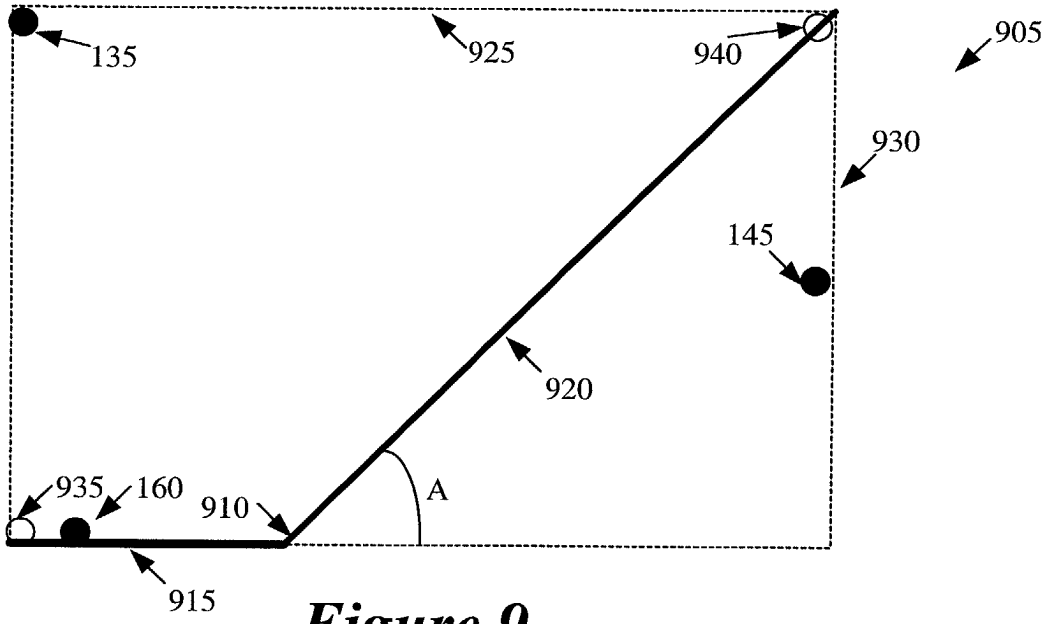

Figure 9

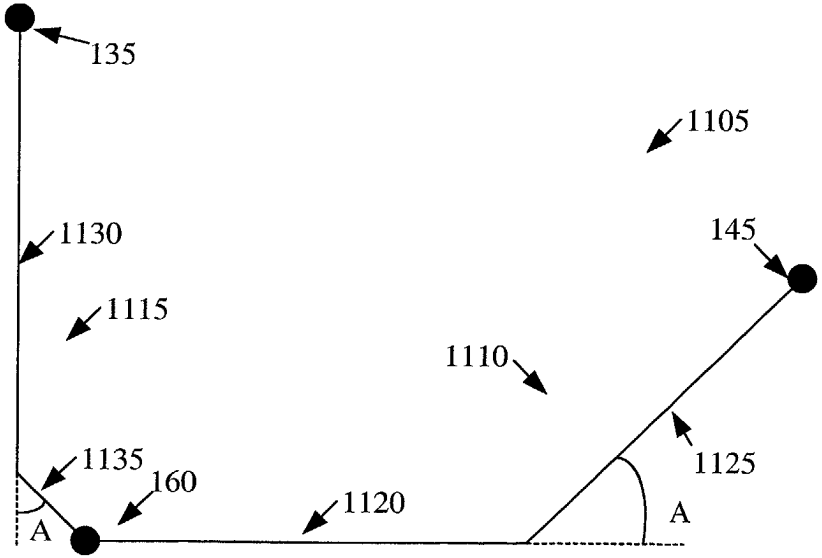

Figure 11

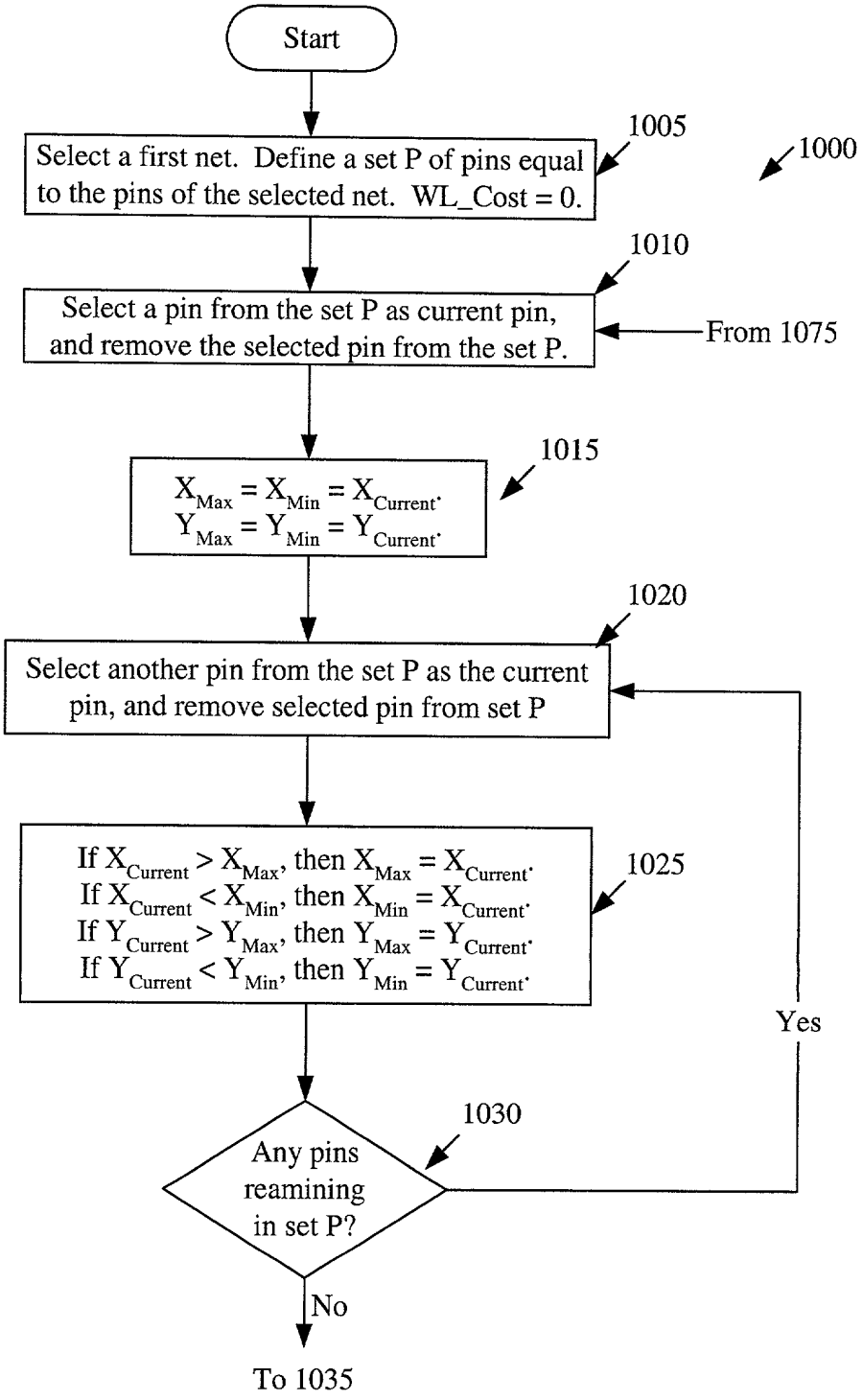

Figure 10A

Figure 10: ***Figure 10A*** / ***Figure 10B***

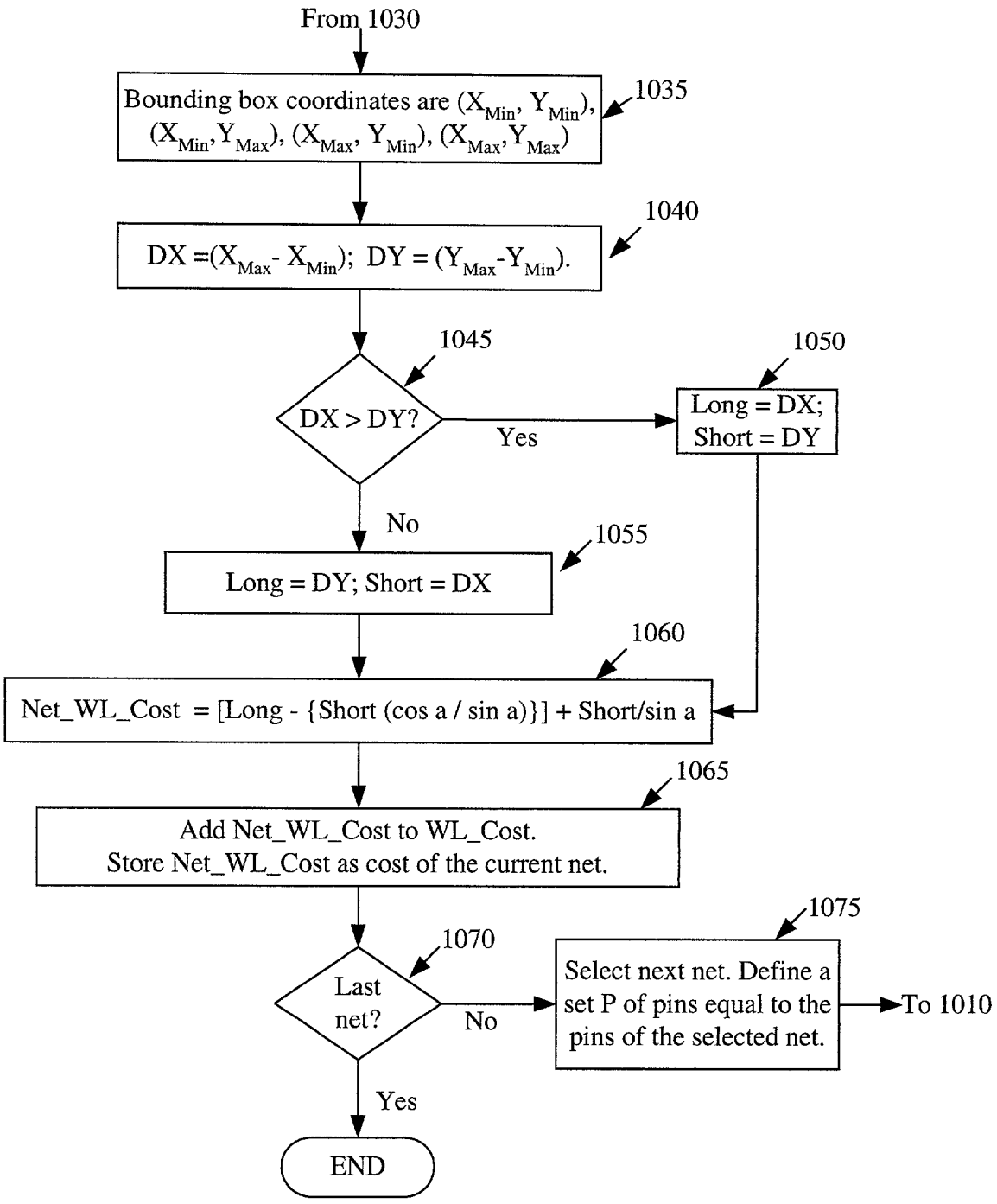
From 1030
Bounding box coordinates are (X_{Min}, Y_{Min}), (X_{Min},Y_{Max}), (X_{Max}, Y_{Min}), (X_{Max},Y_{Max})
1035
DX =(X_{Max}- X_{Min}); DY = (Y_{Max}-Y_{Min}).
1040
1045
DX > DY?
Yes
1050
Long = DX; Short = DY
No
1055
Long = DY; Short = DX
1060
Net_WL_Cost = [Long - {Short (cos a / sin a)}] + Short/sin a
1065
Add Net_WL_Cost to WL_Cost.
Store Net_WL_Cost as cost of the current net.
1070
Last net?
No
1075
Select next net. Define a set P of pins equal to the pins of the selected net.
To 1010
Yes
END

Figure 10B

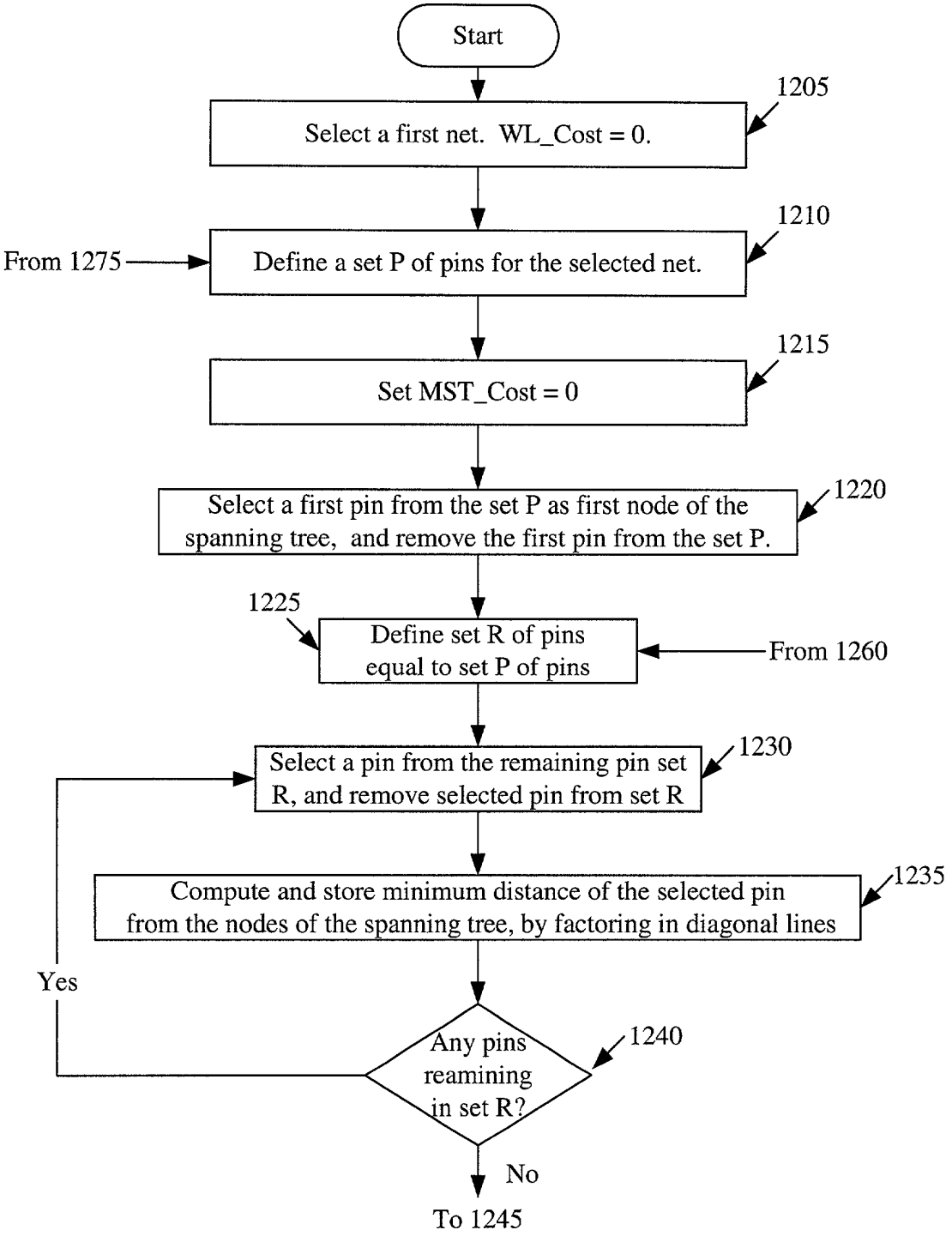

Figure 12A

Figure 12: ***Figure 12A*** / ***Figure 12B***

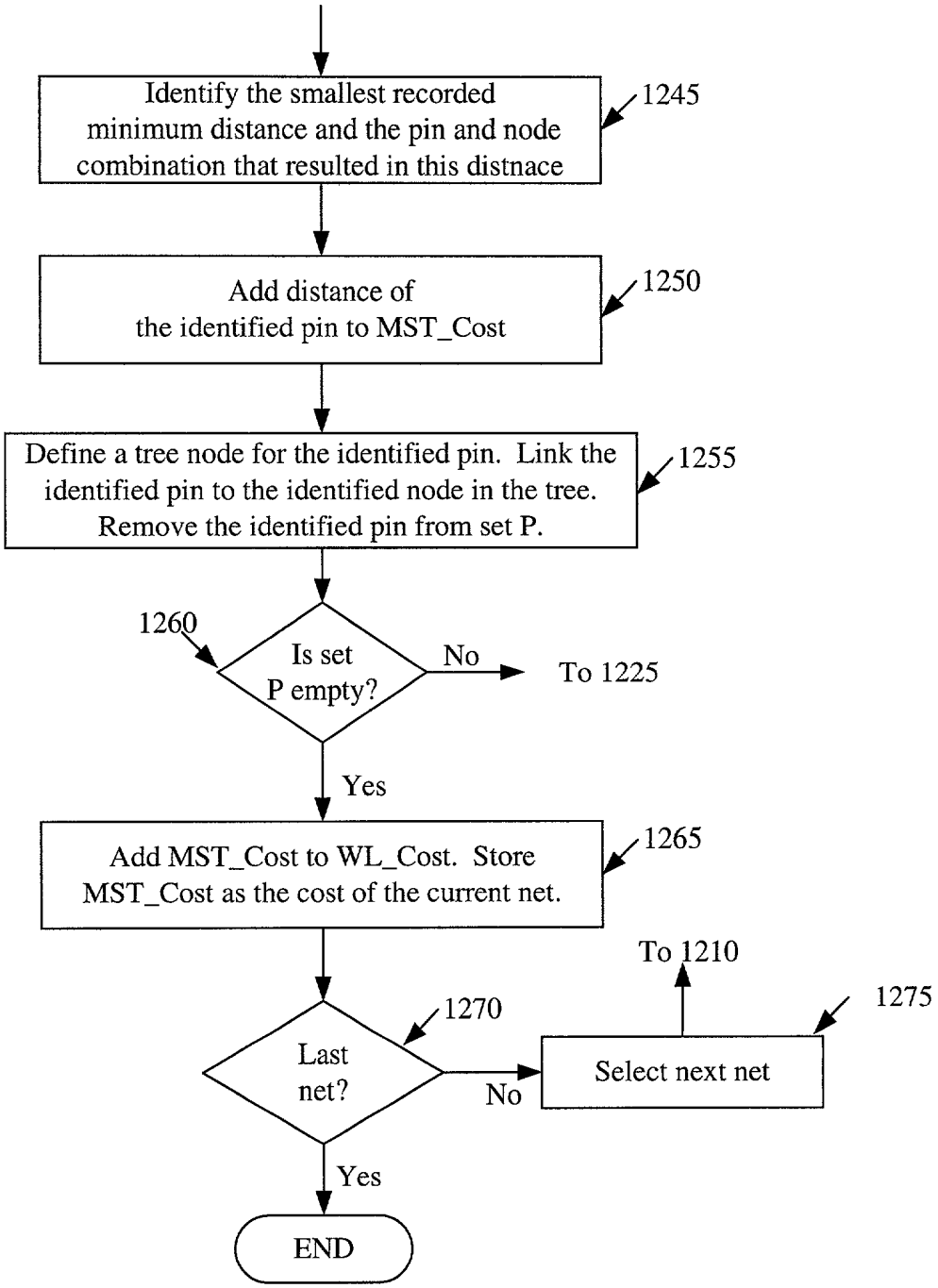
Identify the smallest recorded minimum distance and the pin and node combination that resulted in this distnace
1245
Add distance of the identified pin to MST_Cost
1250
Define a tree node for the identified pin. Link the identified pin to the identified node in the tree. Remove the identified pin from set P.
1255
1260
Is set P empty?
No
To 1225
Yes
Add MST_Cost to WL_Cost. Store MST_Cost as the cost of the current net.
1265
To 1210
1270
1275
Last net?
No
Select next net
Yes
END

Figure 12B

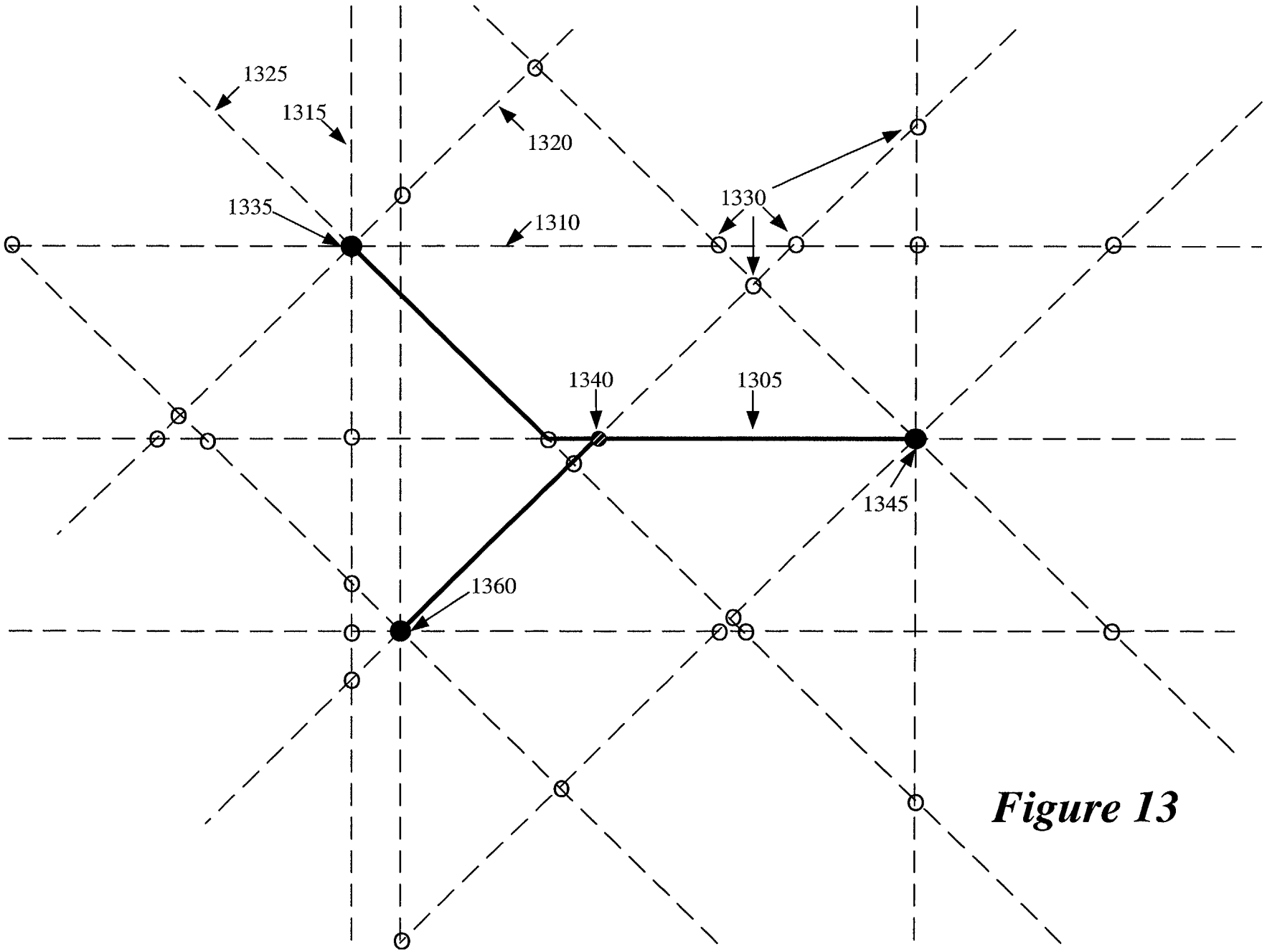

Figure 13

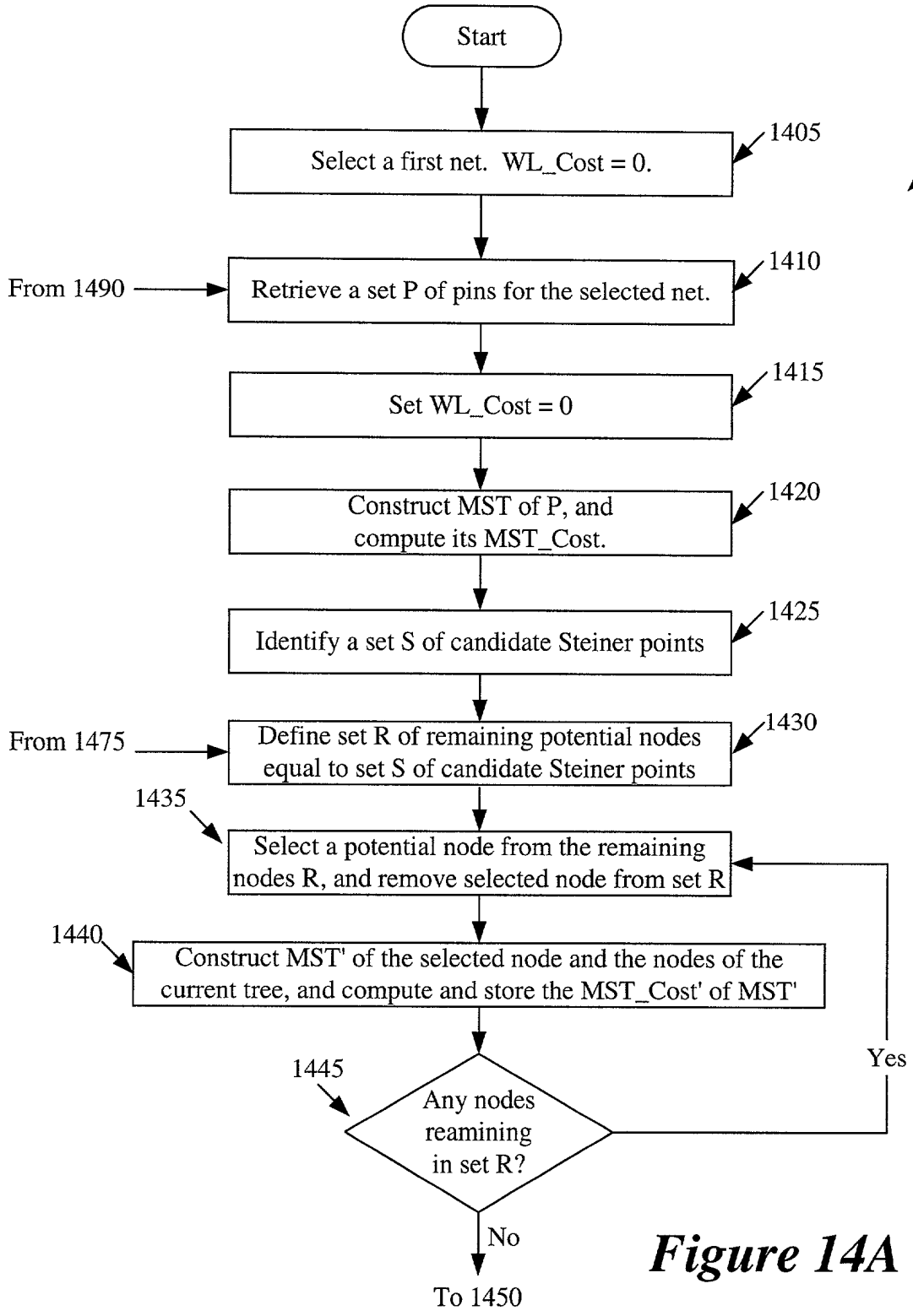

Figure 14A

Figure 14: ***Figure 14A*** / ***Figure 14B***

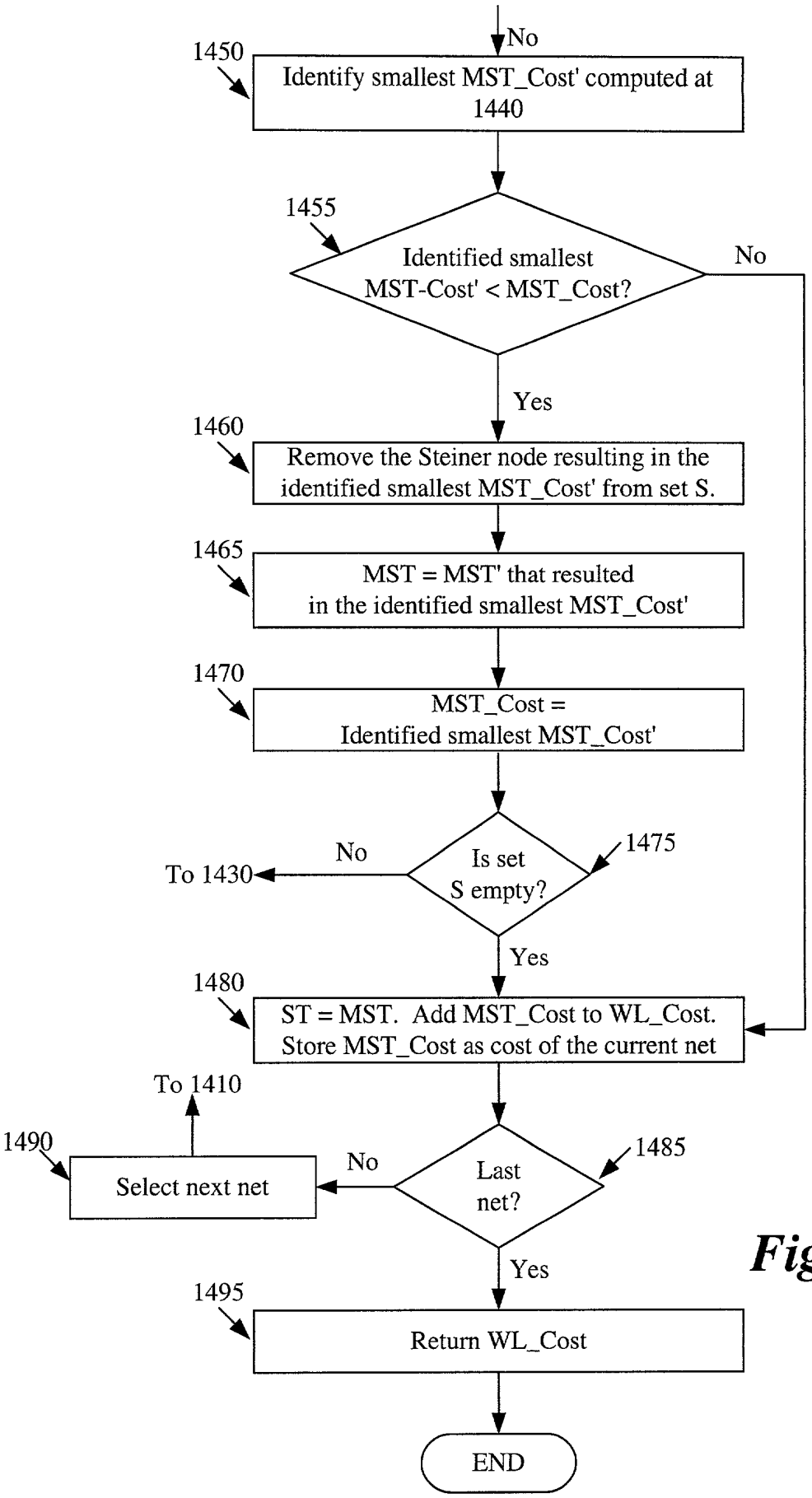
No
1450
Identify smallest MST_Cost' computed at 1440
1455
Identified smallest MST-Cost' < MST_Cost?
No
Yes
1460
Remove the Steiner node resulting in the identified smallest MST_Cost' from set S.
1465
MST = MST' that resulted in the identified smallest MST_Cost'
1470
MST_Cost = Identified smallest MST_Cost'
No
To 1430
Is set S empty?
1475
Yes
1480
ST = MST. Add MST_Cost to WL_Cost. Store MST_Cost as cost of the current net
To 1410
1490
Select next net
No
Last net?
1485
Yes
1495
Return WL_Cost
END

Figure 14B

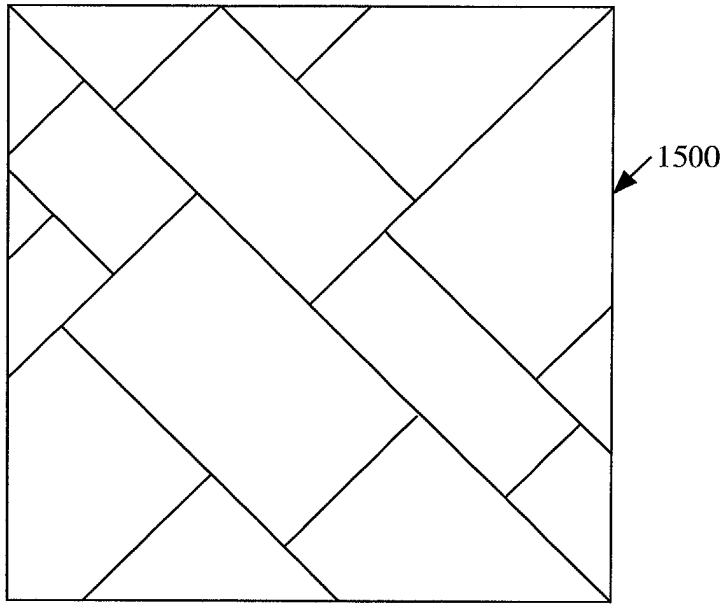

Figure 15

TOHOSO" SH2E260

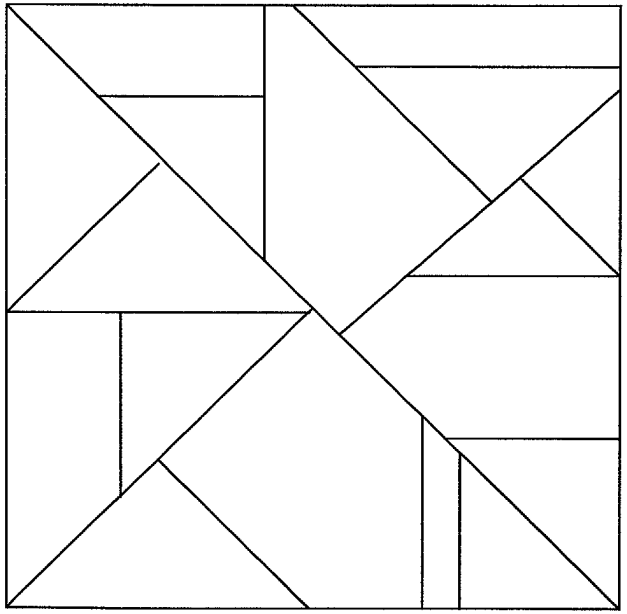

Figure 16

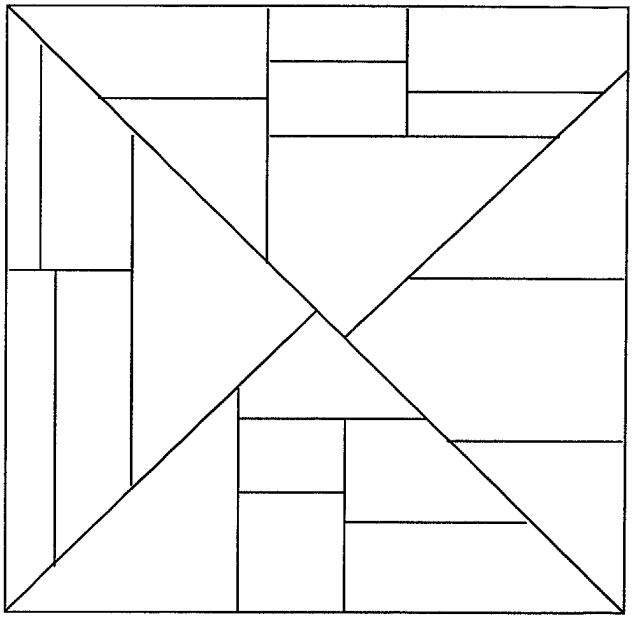

Figure 17

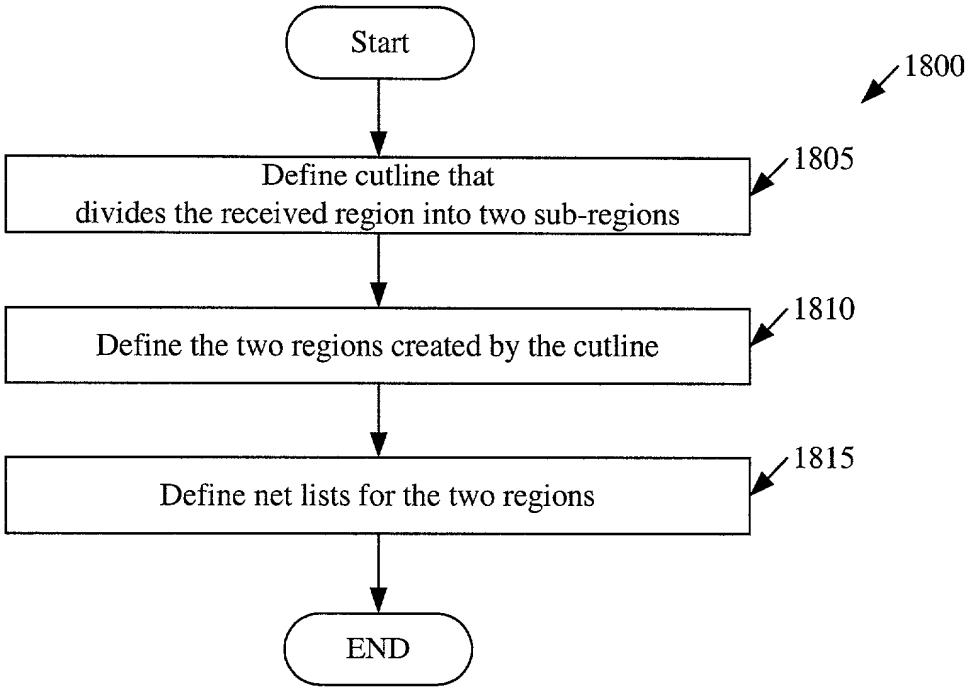
Start
1800
Define cutline that
divides the received region into two sub-regions
1805
Define the two regions created by the cutline
1810
Define net lists for the two regions
1815
END

Figure 18

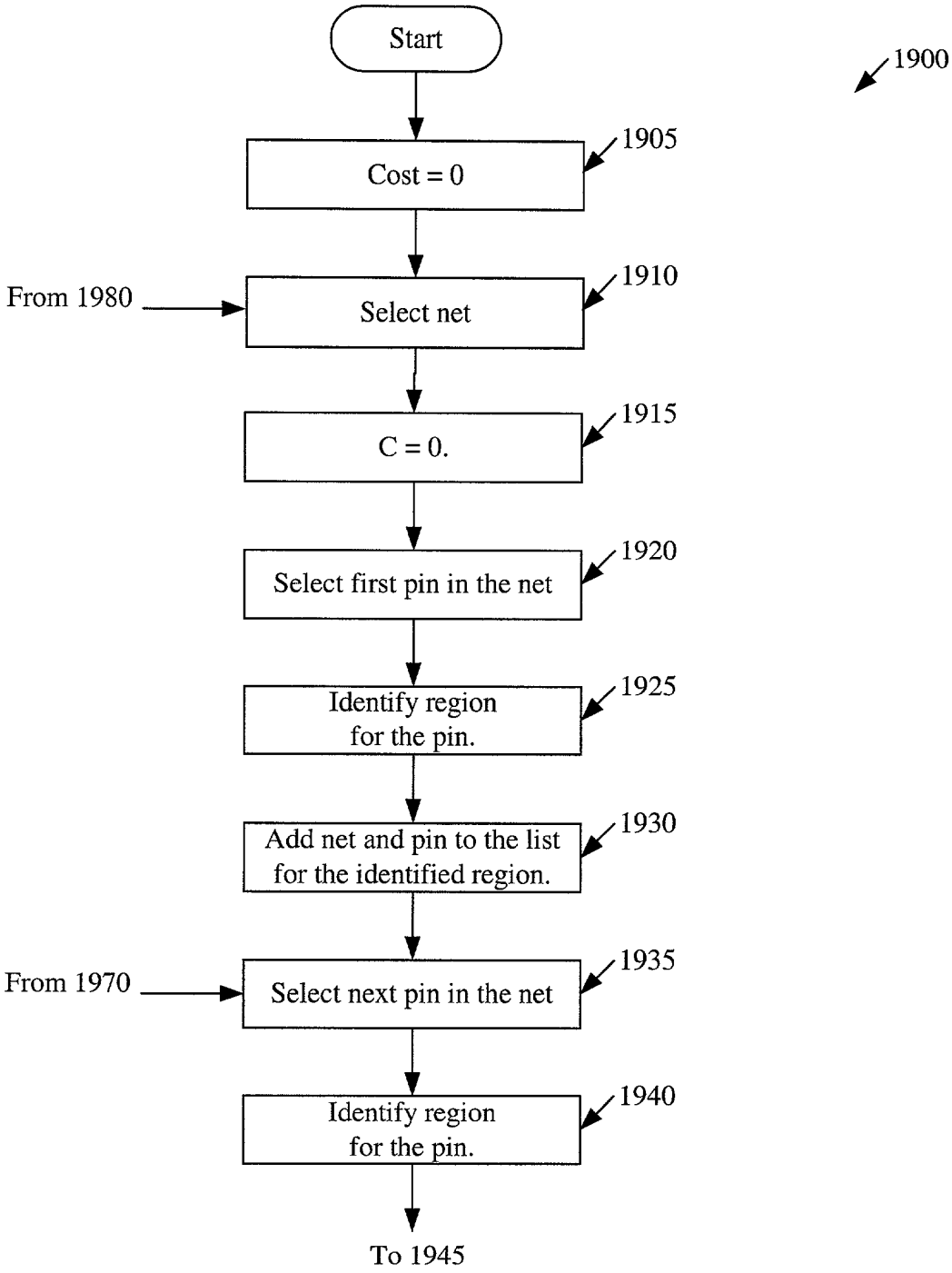

Figure 19A

Figure 19: ***Figure 19A*** / ***Figure 19B***

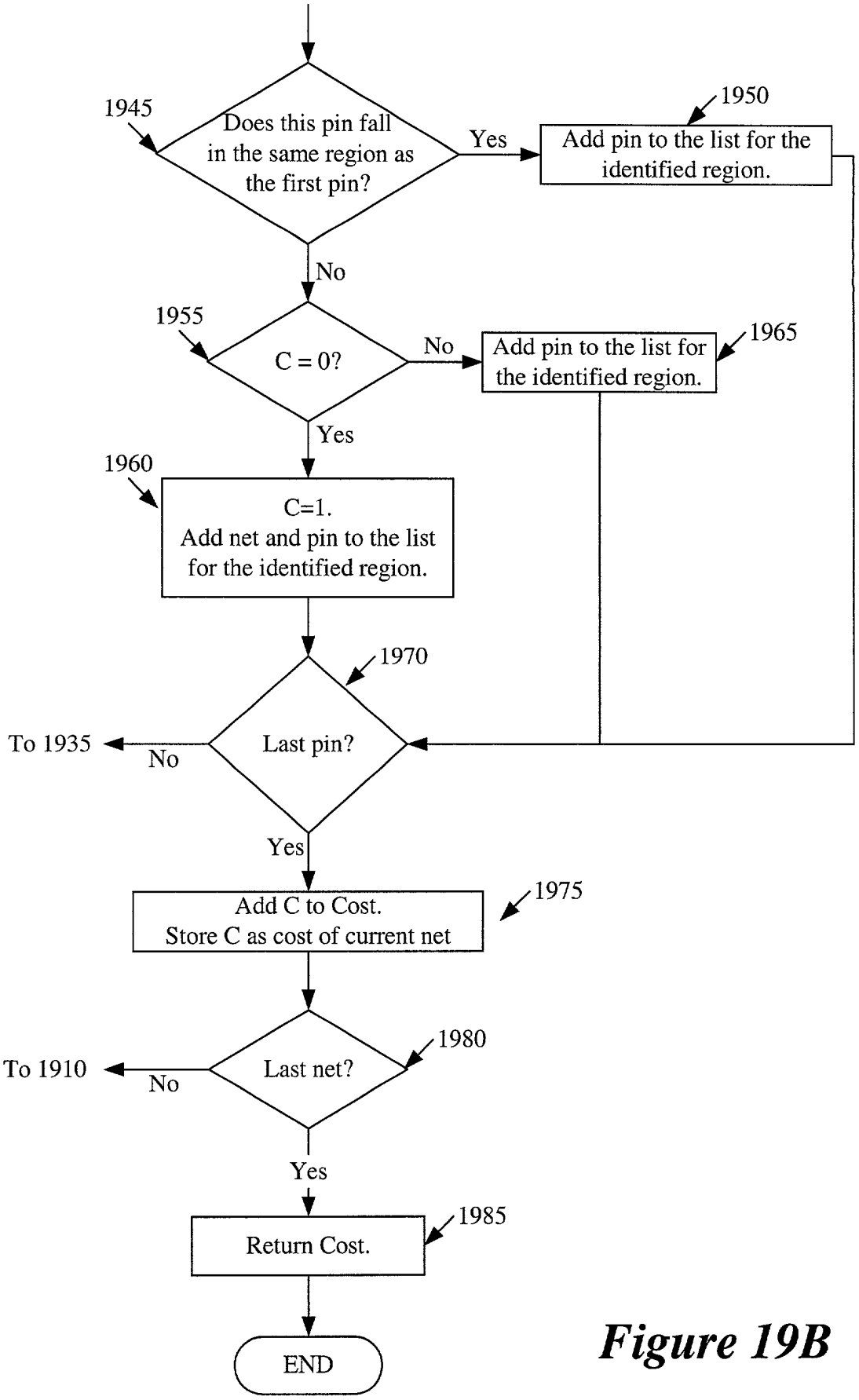
1945
Does this pin fall in the same region as the first pin?
Yes
1950
Add pin to the list for the identified region.
No
1955
C = 0?
No
Add pin to the list for the identified region.
1965
Yes
1960
C=1.
Add net and pin to the list for the identified region.
1970
Last pin?
To 1935
No
Yes
Add C to Cost.
Store C as cost of current net
1975
Last net?
1980
To 1910
No
Yes
Return Cost.
1985
END

Figure 19B

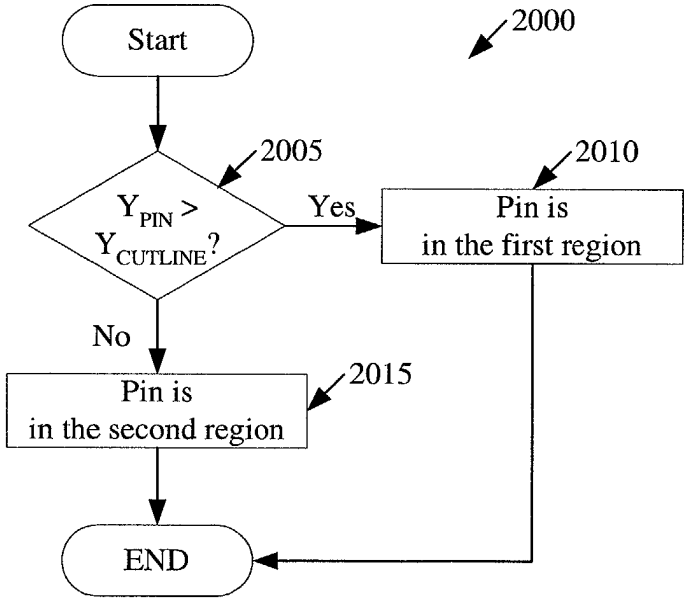

Figure 20

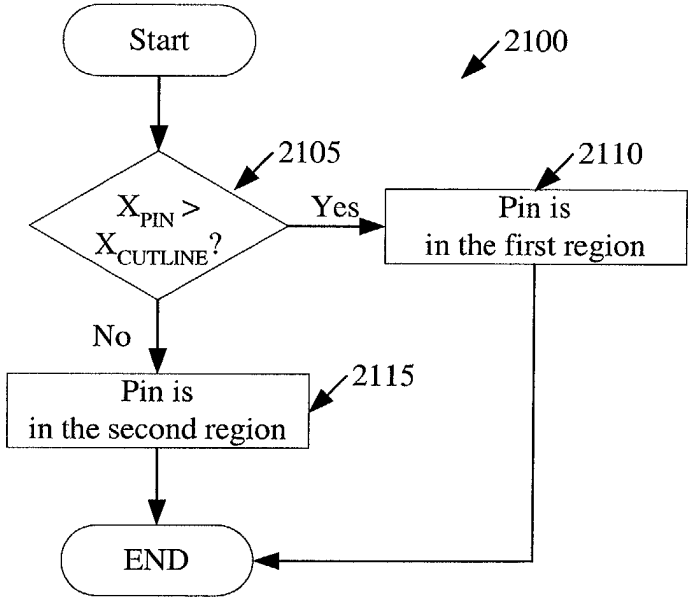

Figure 21

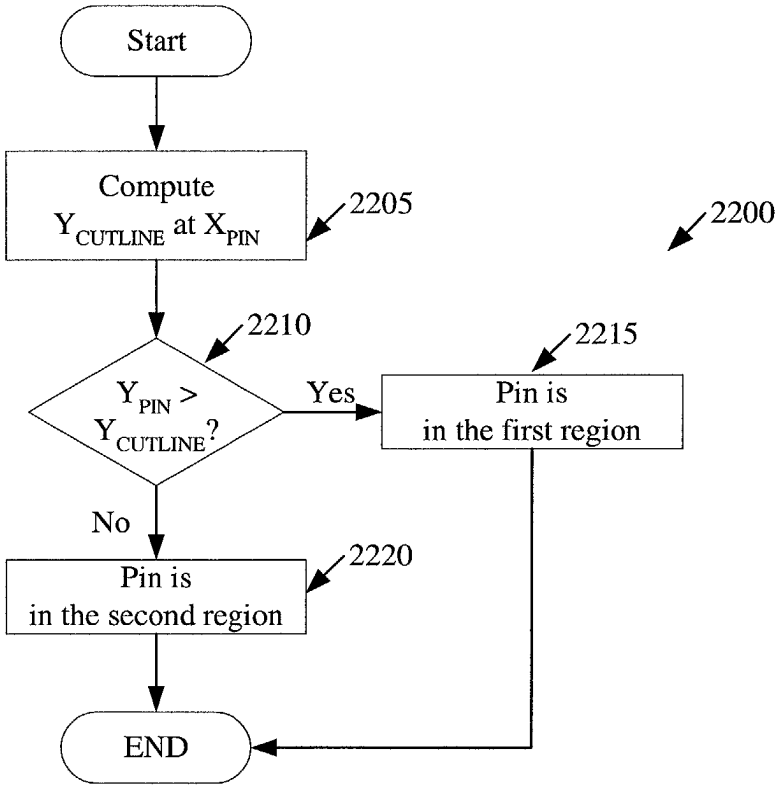
Start
Compute
$Y_{CUTLINE}$ at X_{PIN}
2205
2200
2210
Y_{PIN} >
$Y_{CUTLINE}$?
Yes
2215
Pin is
in the first region
No
2220
Pin is
in the second region
END

Figure 22

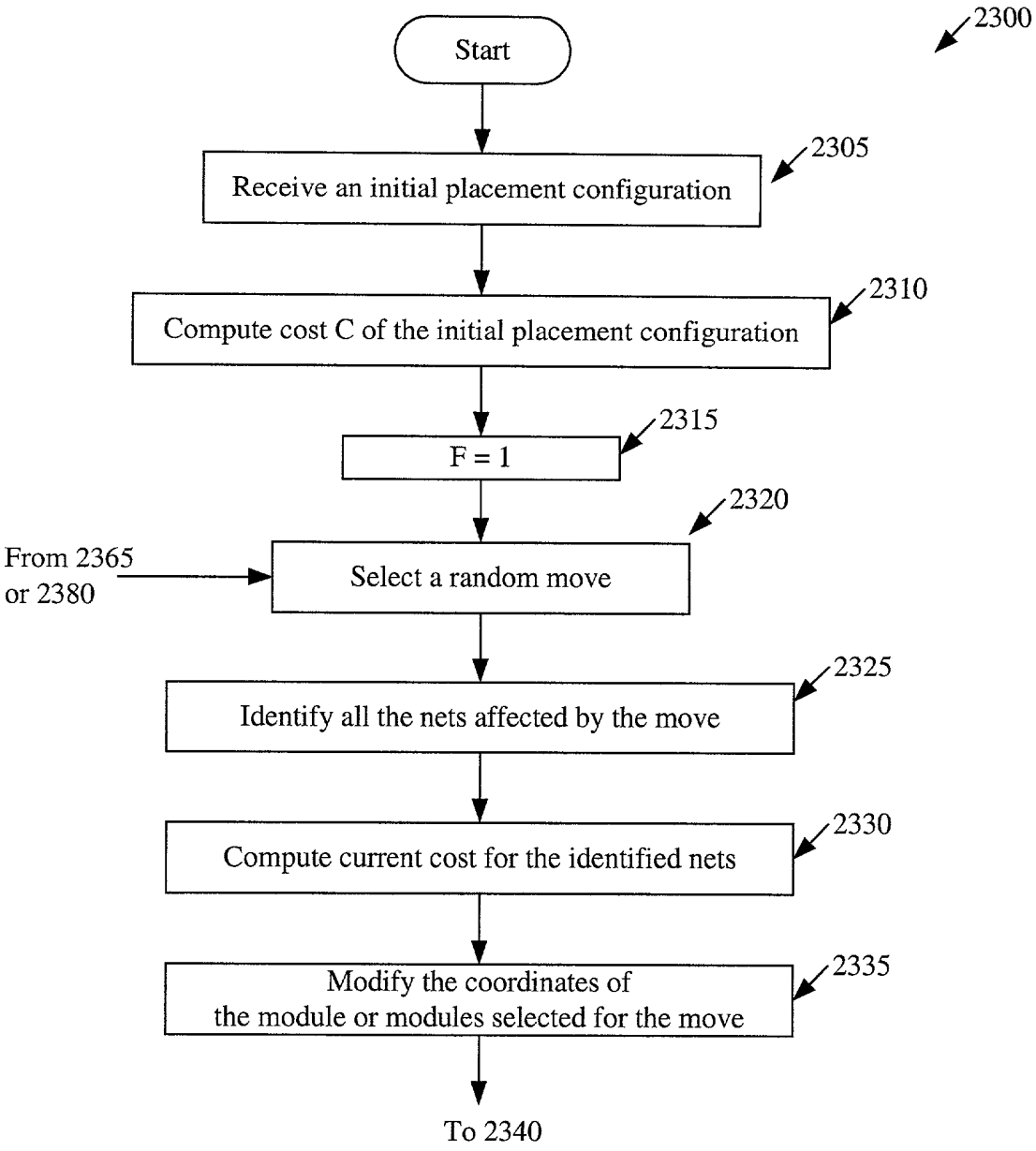

Figure 23A

Figure 23: ***Figure 23A*** / ***Figure 23B***

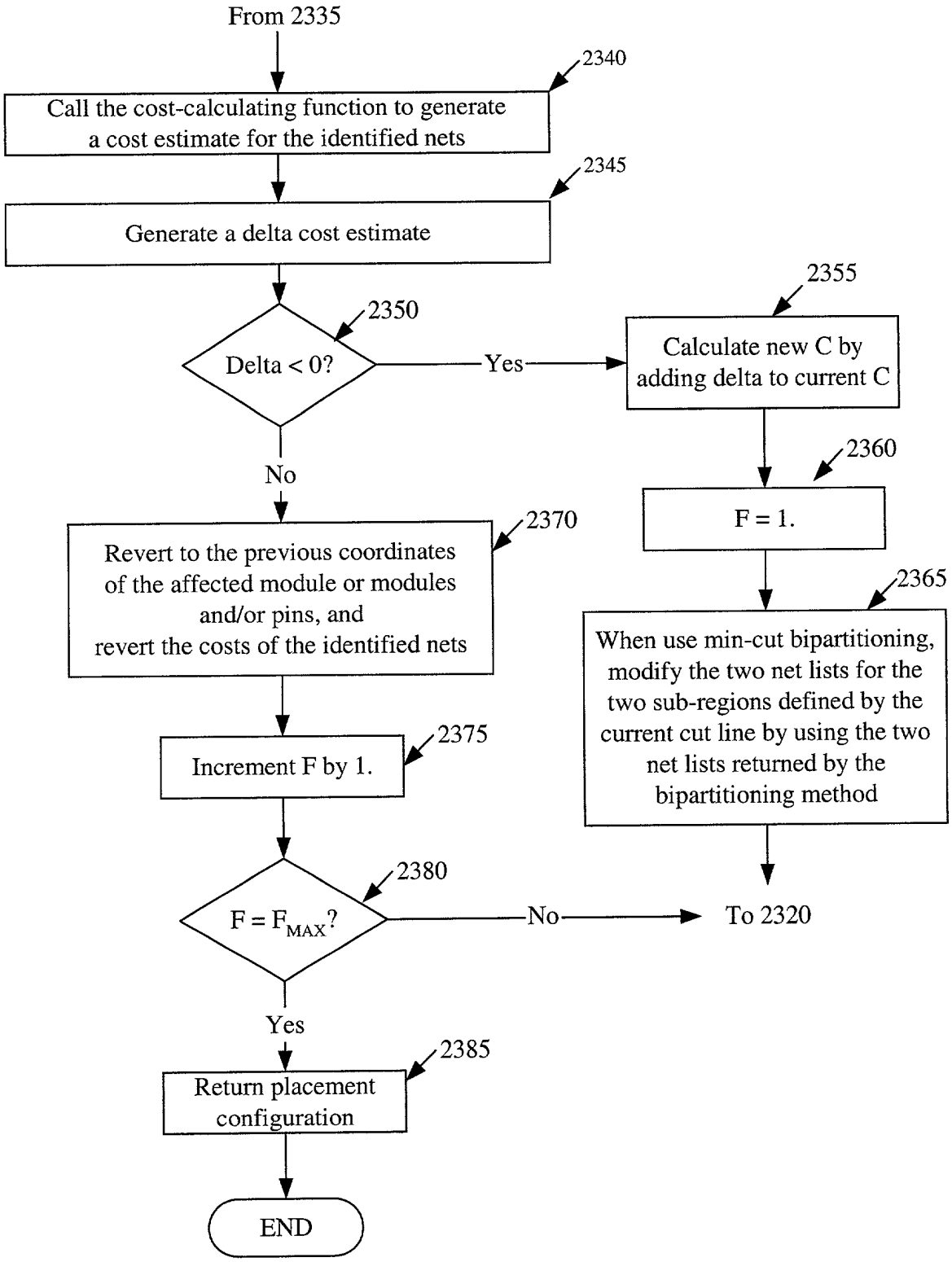
From 2335
2340
Call the cost-calculating function to generate a cost estimate for the identified nets
2345
Generate a delta cost estimate
2350
Delta < 0?
Yes
2355
Calculate new C by adding delta to current C
2360
F = 1.
2365
When use min-cut bipartitioning, modify the two net lists for the two sub-regions defined by the current cut line by using the two net lists returned by the bipartitioning method
No
2370
Revert to the previous coordinates of the affected module or modules and/or pins, and revert the costs of the identified nets
2375
Increment F by 1.
2380
F = F_MAX?
No
To 2320
Yes
2385
Return placement configuration
END

Figure 23B

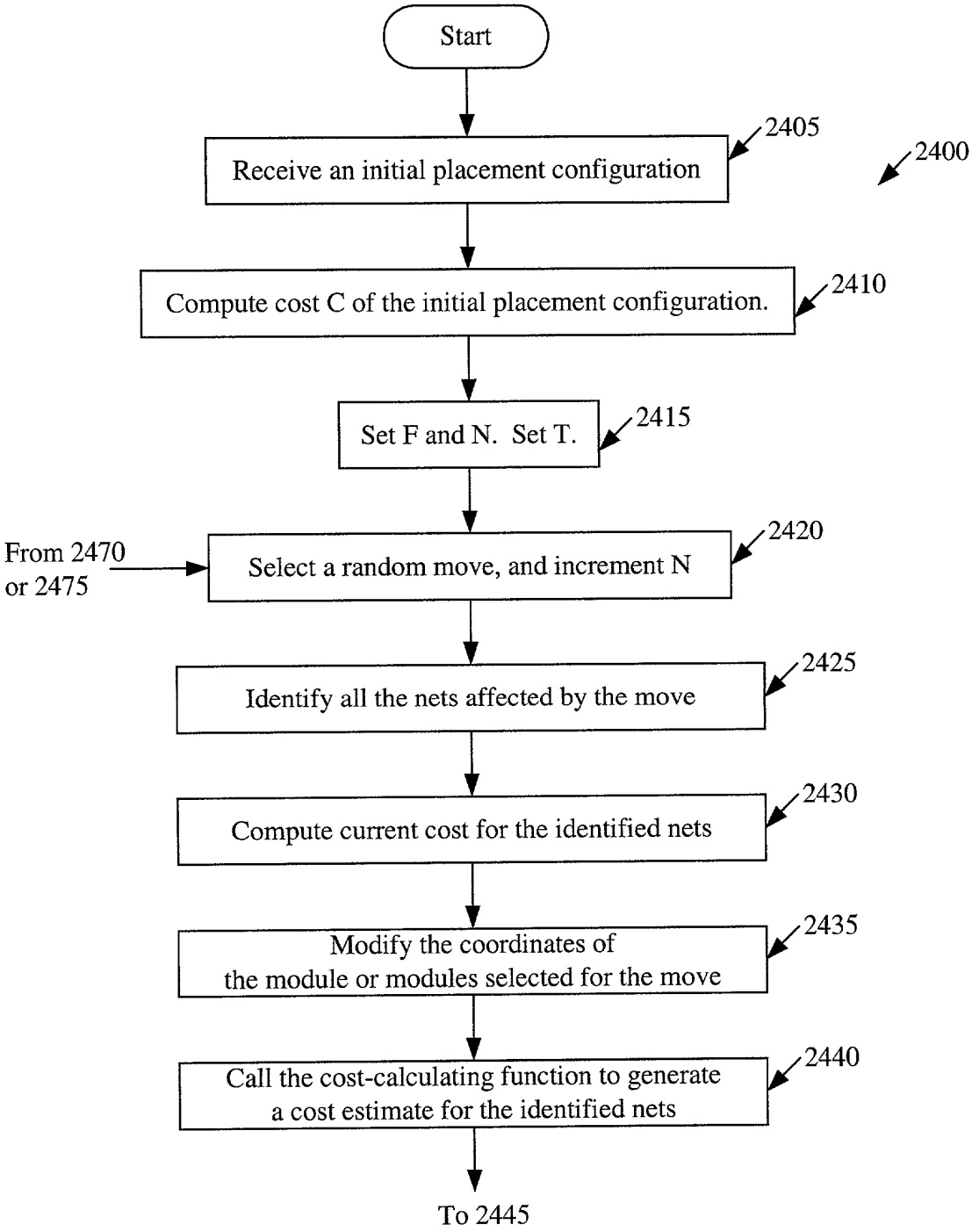

Figure 24A

Figure 24: Figure 24A / Figure 24B

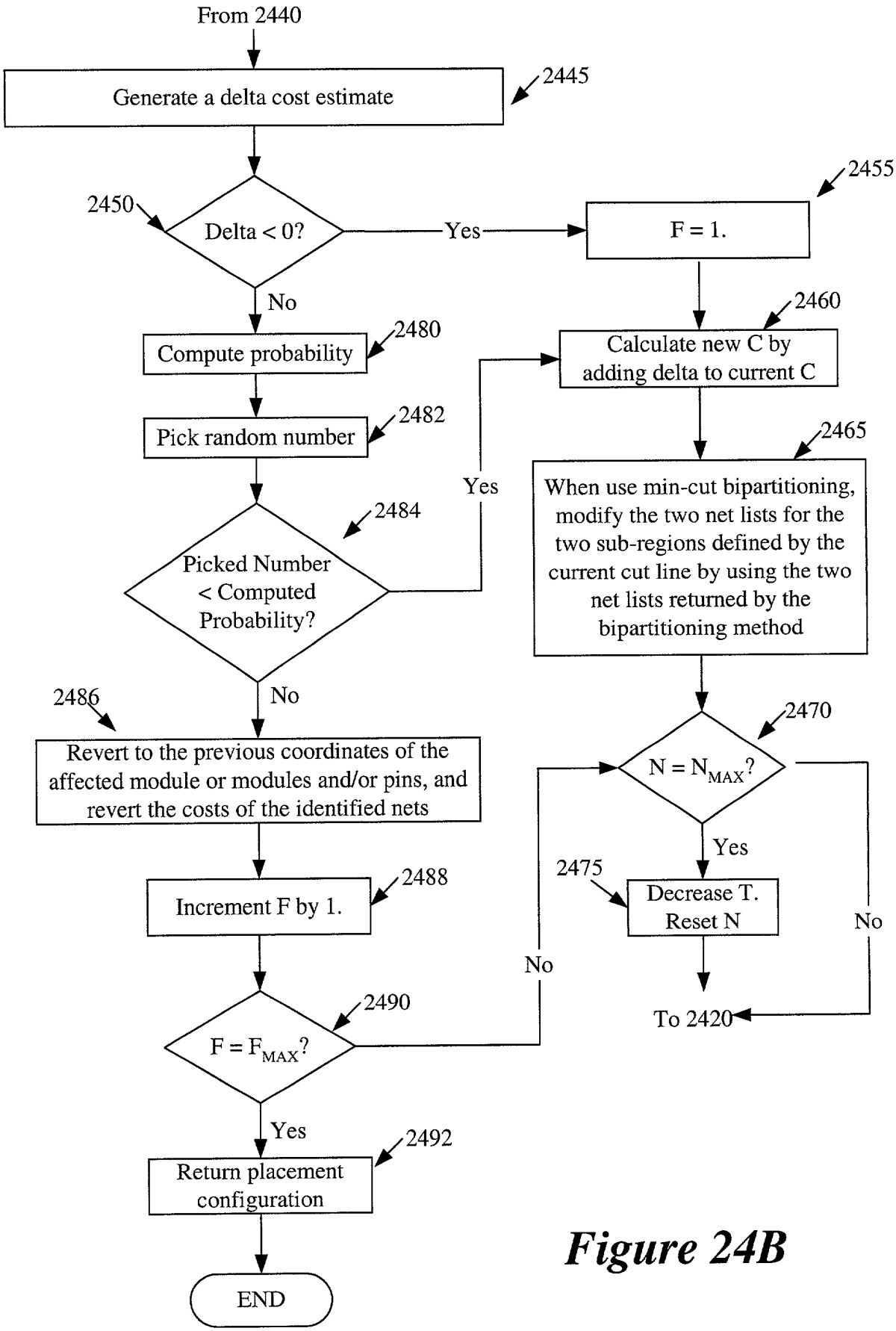
From 2440
Generate a delta cost estimate
2445
2450
Delta < 0?
Yes
2455
F = 1.
No
2460
Compute probability
2480
Calculate new C by adding delta to current C
Pick random number
2482
2465
Yes
2484
When use min-cut bipartitioning, modify the two net lists for the two sub-regions defined by the current cut line by using the two net lists returned by the bipartitioning method
Picked Number < Computed Probability?
No
2486
2470
Revert to the previous coordinates of the affected module or modules and/or pins, and revert the costs of the identified nets
N = N_MAX?
Yes
2475
Increment F by 1.
2488
Decrease T. Reset N
No
No
2490
To 2420
F = F_MAX?
Yes
2492
Return placement configuration
END

Figure 24B

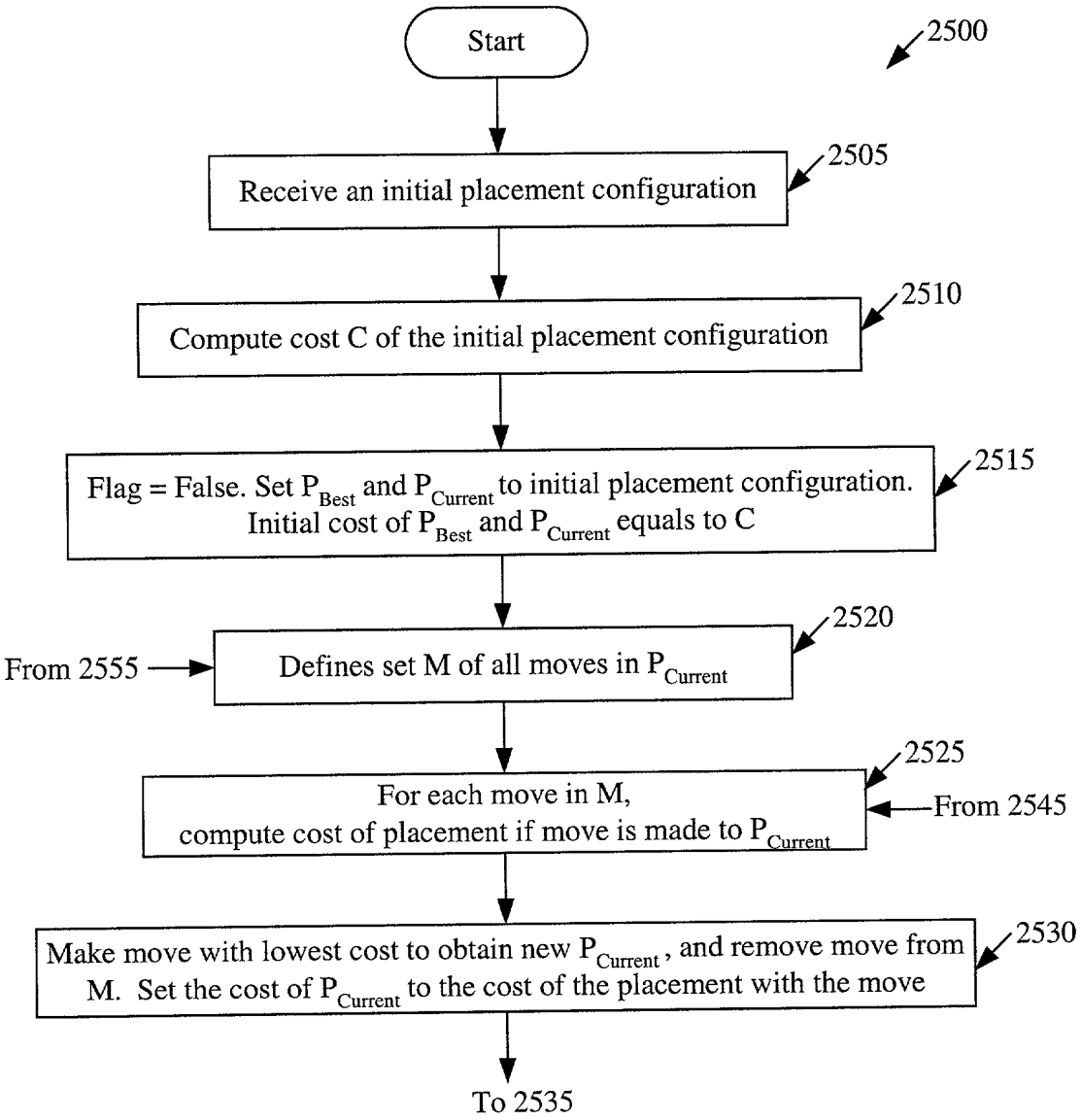

Figure 25A

Figure 25: Figure 25A / Figure 25B

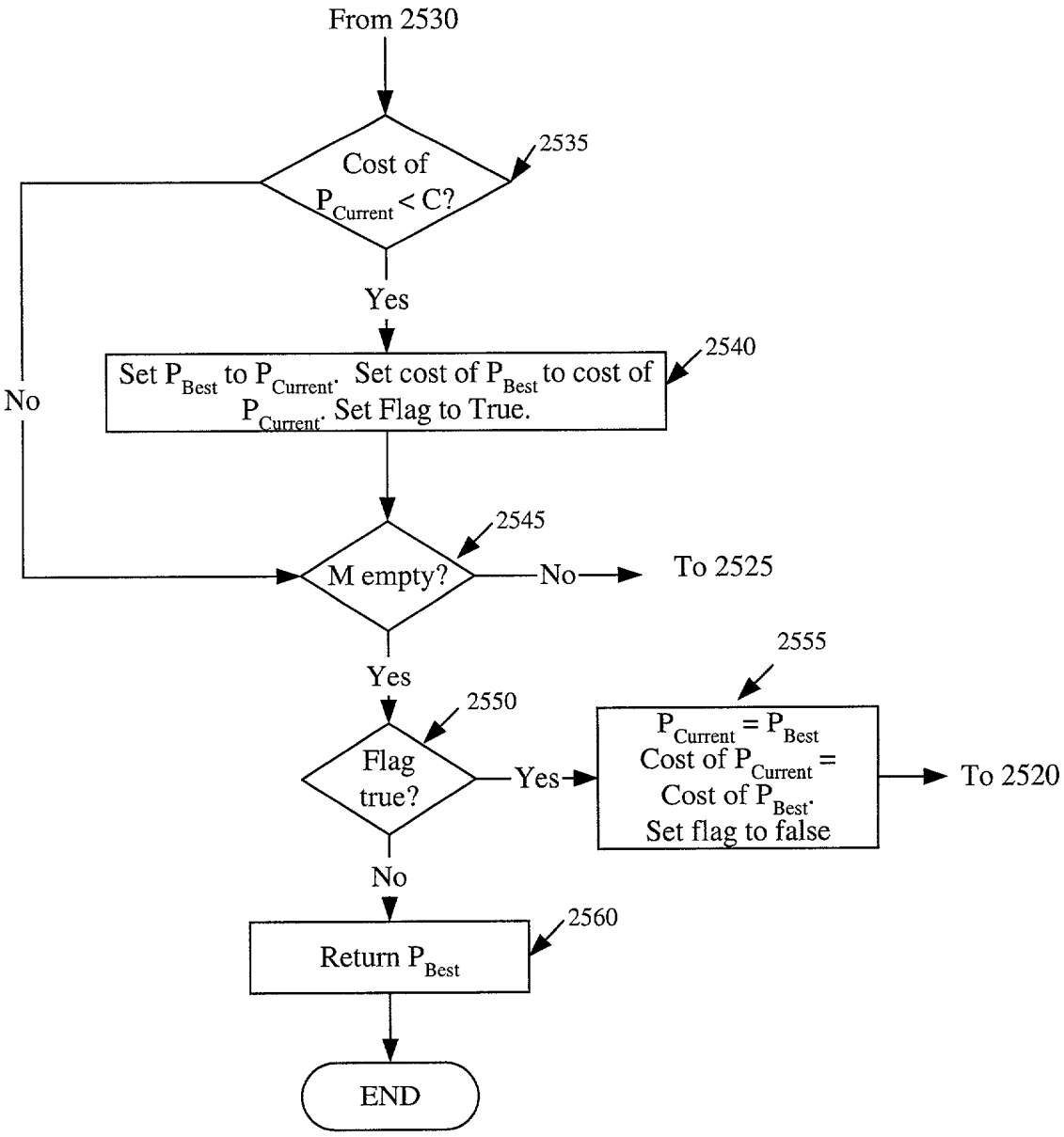
From 2530
Cost of $P_{Current} < C$?
2535
Yes
No
Set P_{Best} to $P_{Current}$. Set cost of P_{Best} to cost of $P_{Current}$. Set Flag to True.
2540
M empty?
2545
No
To 2525
Yes
Flag true?
2550
Yes
$P_{Current} = P_{Best}$ Cost of $P_{Current}$ = Cost of P_{Best}. Set flag to false
2555
To 2520
No
Return P_{Best}
2560
END

Figure 25B

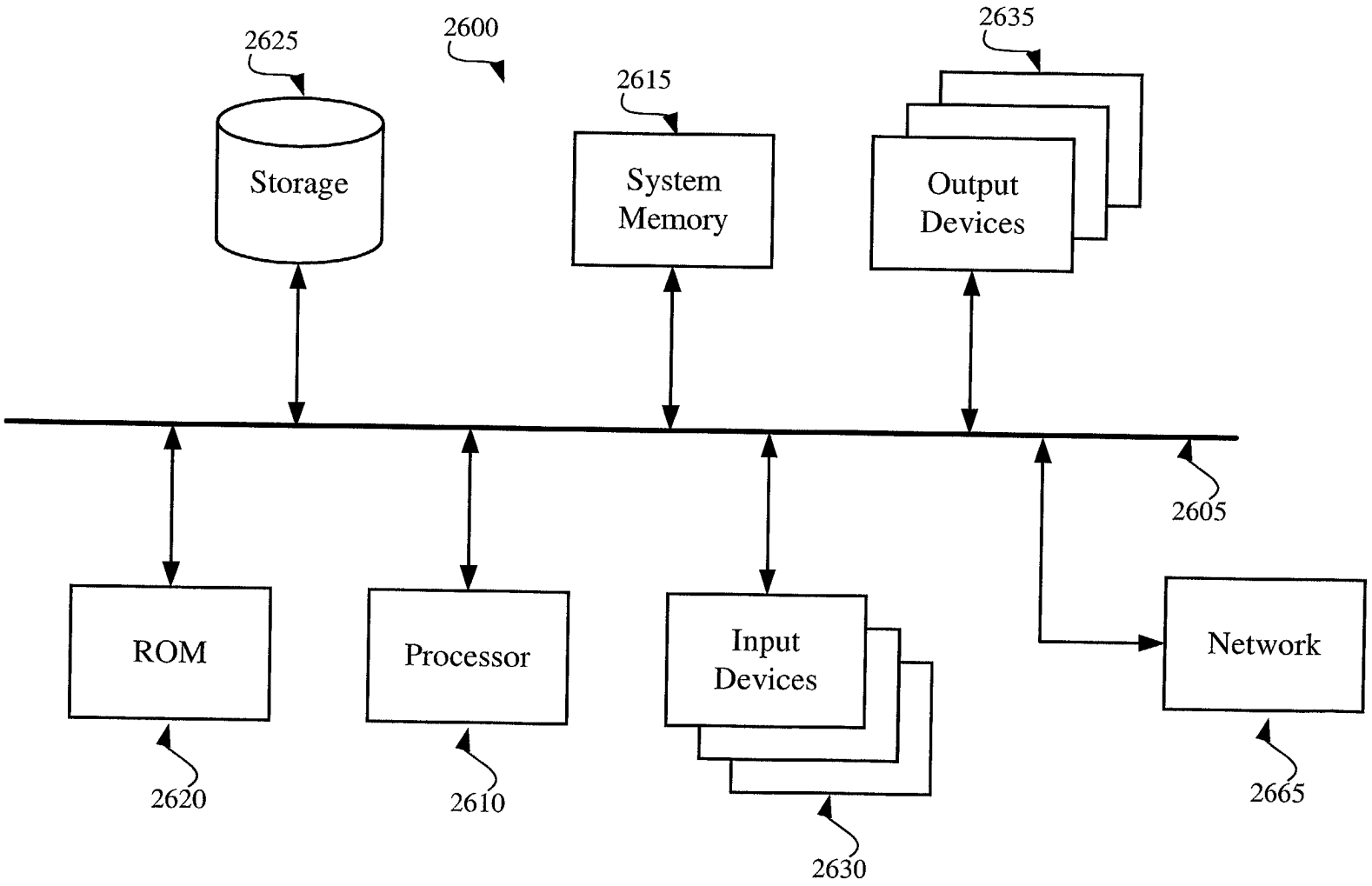
2625
2600
2635
2615
Storage
System Memory
Output Devices
2605
ROM
Processor
Input Devices
Network
2620
2610
2630
2665

Figure 26